California Air Resources Board's
Emissions Inventory Series

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Overview of the On-Road Emissions Inventory

On-Road Inventory: **An Accounting of the Emissions Attributable to On-Road Mobile Sources**

The Air Resources Board has maintained an on-road emissions inventory for over twenty five years. These estimates are used both within the agency and by other entities to assess the environmental impact of adopted or proposed projects.

As can be seen in the graphic, despite thirty years of control, on-road motor vehicle continue to dominate the inventory of criteria pollutants (HC, CO and NOx) by virtue of their sheer number.

The Emissions Inventory is one of the foundations upon which the Air Resources Board rests its regulatory strategy. Prior to the consideration of any new vehicle standard or in-use emissions control program, an inventory assessment is made of that source's contribution to the overall inventory, and what properties and processes might have led to excess emissions. The inventory is used as a gauge by which progress toward attainment is measured, and by which each estimate of the cost effectiveness of control is assessed.

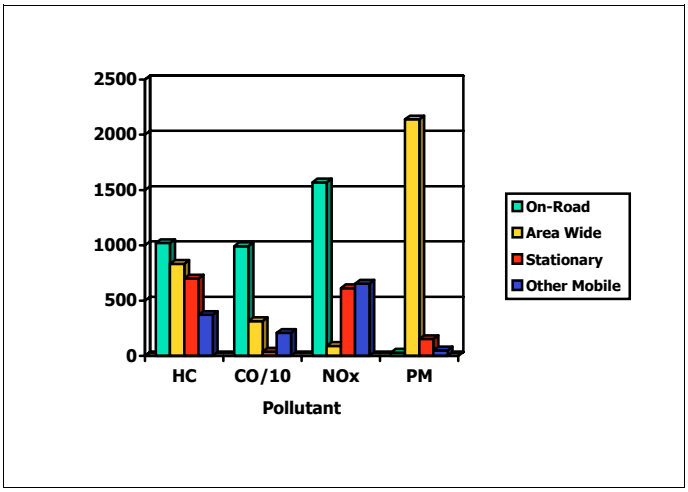
The on-road emissions inventory is an estimation of the total emissions contributed by the over **24,000,000** on-road motor **vehicles** that are driven over **825,000,000 miles per day** in California. Subtotals are reported for each of the seventeen air basins, thirteen districts and fifty-eight counties.

Despite its implied complexity, the on-road emissions inventory is simply the product of an **emission rate**, usually expressed as grams of pollutant per mile driven, or grams of pollutant per vehicle, and an estimate of activity.

The emission rates are derived primarily from testing performed by the state in their **vehicle surveillance programs** or by the U.S Environmental Protection Agency which maintains a federal emissions inventory.

Activity estimates are derived from a number of sources. Vehicle population and registration distribution, (the number of vehicles by model year), are obtained from the California Department of Motor Vehicles.

Travel information, including vehicle miles of travel (VMT), the distribution of VMT by speed and the number of trips taken per vehicle each day, come from California's Department of Transportation (CALTRANS), local governments including Metropolitan Planning Organizations **(MPOs)** and Councils of Governments **(COGs)**, as well as through fleet monitoring projects where drivers are surveyed or vehicles are "instrumented" with computers to record daily activity.



Emissions Inventory by Category—Statewide in 2002– Tons per Day

The on-road emissions inventory includes estimates of **exhaust** and **evaporative** hydrocarbons, carbon monoxide, oxides of nitrogen and particulate matter associated with exhaust, tire wear and brake wear. Particulate matter estimates are made for total suspended particulate, particulate 10 microns or less in diameter and particulate 2.5 microns in diameter or less. The inventory also includes estimates of emissions of oxides of sulfur, lead, and carbon dioxide.

For planning purposes, it is necessary to predict emission rates, activity, and inventories for the future. For this purpose, growth factors based on economic indicators are used to suggest how many more vehicles will be sold and how many more miles will be driven in future years. Technology assessments are made to estimate how vehicles manufacturers will design cars to comply with future emission standards.

Ambient temperature, relative humidity and dispensed fuel properties have significant impacts on mobile source emissions and these factors are varied to produce month specific, annual average and episodic inventories.

The "summer" episodic inventory represents ozone episode conditions, while the "winter" profile represents conditions present during a carbon monoxide episode.